



# Exotic Snail and Associated Exotic Parasites Affecting Fishes and Waterfowl in Texas

## *San Marcos National Fish Hatchery and Technology Center*

### Introduction

A heterophyid trematode tentatively identified as *Centrocestus formosanus* that completes part of its lifecycle within the digestive gland of the exotic tropical snail *Melanooides tuberculata* has been found in six central and west Texas locations. The trematode has been recovered from the gills of the following threatened or endangered fishes: the fountain darter *Etheostoma fonticola*, the Devils River minnow *Dionda diaboli*, the Rio Grande darter *Etheostoma grahamsi*, the proserpine shiner *Cyprinella proserpina*, the Comanche Springs pupfish *Cyprinodon elegans*, and the Pecos gambusia *Gambusia nobilis*, as well as 10 non-listed fishes.



*Fish heavily infected with Centrocestus formosanus.*

### Discovery

The trematode was first discovered in Texas in a headwater tributary to the San Antonio River in San Antonio (Bexar County) in 1990. It was noticed on fountain darter gills in the Comal River (Comal County) in 1996 and in the San Marcos River (Hays County) in 1997. The trematode then was found in three west Texas locations in 1999: San Felipe Creek (Val Verde County), Balmorhea State Park (Reeves County) and Phantom Lake Spring (Jeff Davis County). A similar or possibly the same trematode was discovered in Florida in 1984.

### Life Cycle

The trematode burrows into the gill filaments of fish where in some species it matures and becomes infective to the

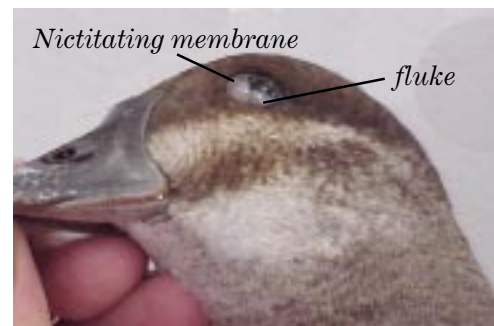
definitive host, a piscivorous bird or mammal. A positive relationship between Yellow-crown Night-Heron *Nyctanassa violacea* nesting sites and *M. tuberculata* infection has been noted, and this bird may be the primary bird that allows the trematode to complete its lifecycle in central Texas. Other birds also may be definitive hosts for this parasite.

Since the encysted trematode damages gill filaments, large parasite loads can be lethal to fish. Some of the Comal River fountain darters were infected to presumed near-lethal levels. Studies are in progress on the effect of the trematode on several fish species.

### Other Parasites

Other parasites have been discovered in *M. tuberculata*. *Haplorchis* sp. was found in the snails from Phantom Lake Spring. This trematode encysts in the muscle tissue of fishes. Snails infected with *Philophthalmus* sp. have been found in the headwaters of the San Antonio River, Comal River, San Felipe Creek, and Balmorhea State Park. *Philophthalmus* sp. use other snail hosts as well, such as *Thiara granifera*. The adult of this parasite infects the nictitating membrane (eyelid) of waterfowl. Since direct mortality does not result from infection, and eradication of the snail host is almost impossible, treatment of the birds is not often done; however, treatments do exist.

Florida, Louisiana, Arizona, Colorado, California, Nevada, Montana, Oregon and Hawaii also currently have populations of *M. tuberculata*. The snail since the 1960s, and the heterophyid trematode since 1979, have been spreading across Mexico.



*Duck infected with Philophthalmus sp.*



*Melanooides tuberculata*

### Action Needed

With only limited data, it is too early to assess the effect that the heterophyid parasite may have on native fish populations. Aquatic habitats that can support *M. tuberculata* throughout the year, such as warm-water spring systems and power plant lakes, should be surveyed to determine if this exotic snail and associated parasites are present. Personnel conducting surveys are requested to report their findings to the address listed below.

Several groups are studying the snail, parasites, birds and fishes:

Kelly McDermott, Melissa Salmon,  
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